Name: Date:

Polynomial Factoring solution (version 692)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 10x + 43 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(10) \pm \sqrt{(10)^2 - 4(1)(43)}}{2(1)}$$

$$x = \frac{-(10) \pm \sqrt{100 - 172}}{2(1)}$$

$$x = \frac{-10 \pm \sqrt{-72}}{2}$$

$$x = \frac{-10 \pm \sqrt{-36 \cdot 2}}{2}$$

$$x = \frac{-10 \pm 6\sqrt{2}\, i}{2}$$

$$x = -5 \pm 3\sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $3 - 8i$ and $9 + 5i$ in standard form ($a + bi$).**

Solution

$$(3 - 8i) \cdot (9 + 5i)$$

$$27 + 15i - 72i - 40i^2$$

$$27 + 15i - 72i + 40$$

$$27 + 40 + 15i - 72i$$

$$67 - 57i$$

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3. **Write function $f(x) = x^3 + 3x^2 - 18x - 40$ in factored form. I'll give you a hint: one factor is $(x + 5)$.**

Solution

	1	3	-18	-40
-5		-5	10	40
	1	-2	-8	0

$$f(x) = (x + 5)(x^2 - 2x - 8)$$

$$f(x) = (x + 5)(x - 4)(x + 2)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x + 7)^2 \cdot (x + 4)^2 \cdot (x - 1) \cdot (x - 5)$$

Sketch a graph of polynomial $y = p(x)$.